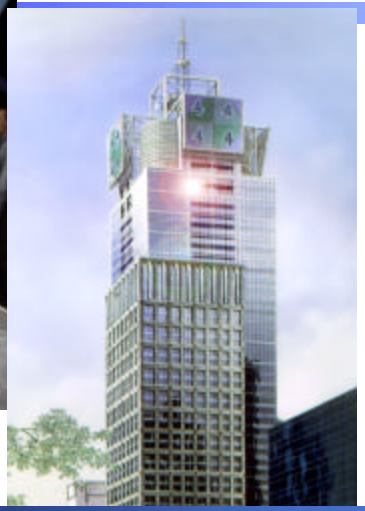
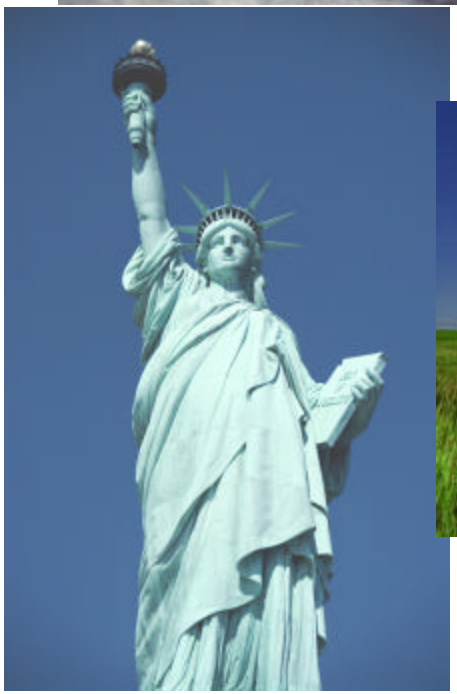
Energy Efficiency and Renewable Energy





Challenges and Opportunities in Federal Energy Management

Dan W. Reicher
Assistant Secretary

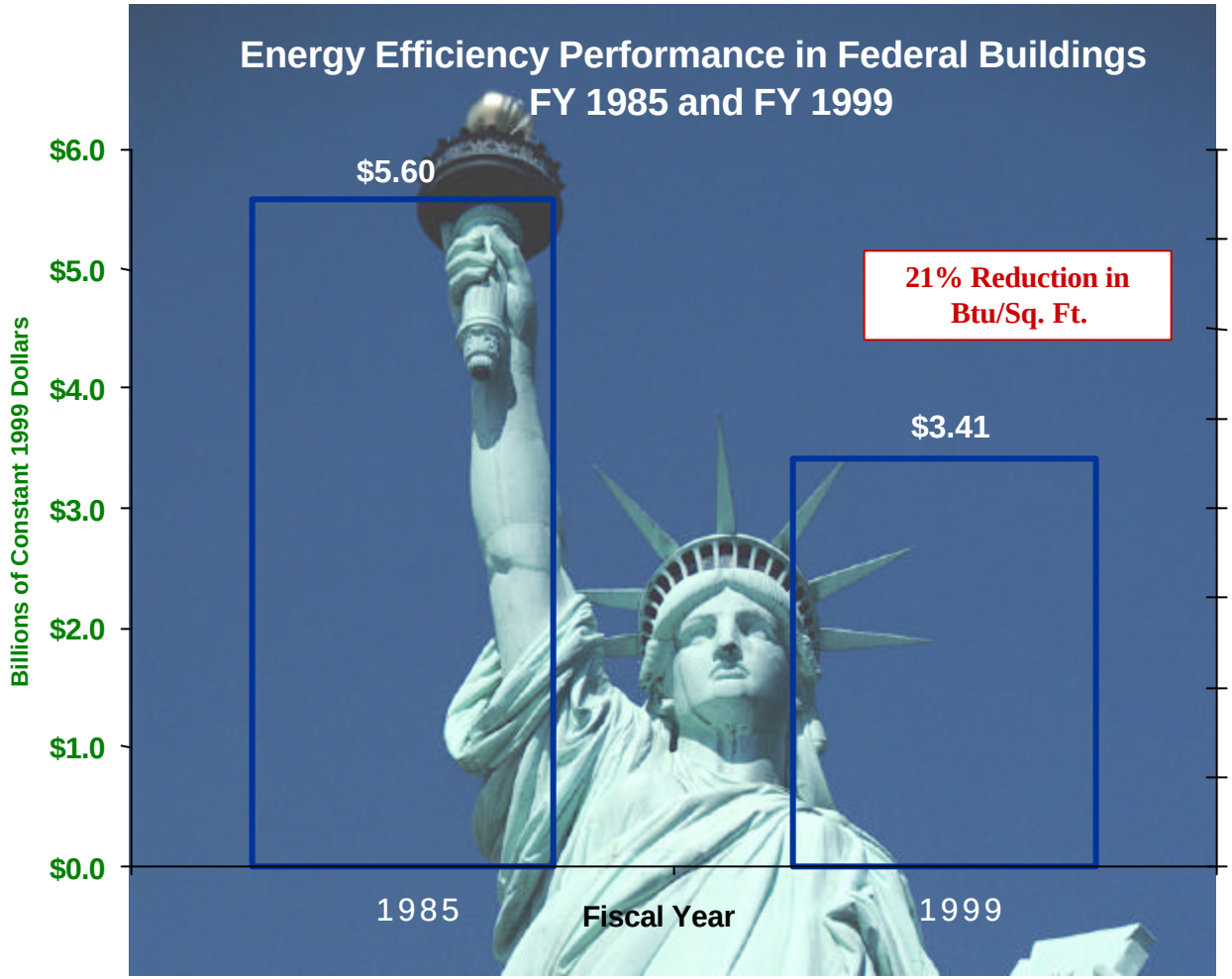
October 23, 2000

Why We are Here

Executive Order 13123 - *Greening the Government Through Energy Efficient Management*

"Sec. 307. Public/Private Advisory Committee. The Secretary of Energy will appoint an advisory committee consisting of representatives from ***Federal agencies, State governments, energy service companies, utility companies, equipment manufacturers, construction and architectural companies, environmental, energy and consumer groups, and other energy-related organizations****. The committee will provide input on Federal energy management, including how to* ***improve use of Energy Savings Performance Contracts and utility energy-efficiency service contracts, improve procurement of ENERGY STAR® and other energy efficient products, improve building design, reduce process energy use, and enhance applications of efficient and renewable energy technologies*** *at Federal facilities."*

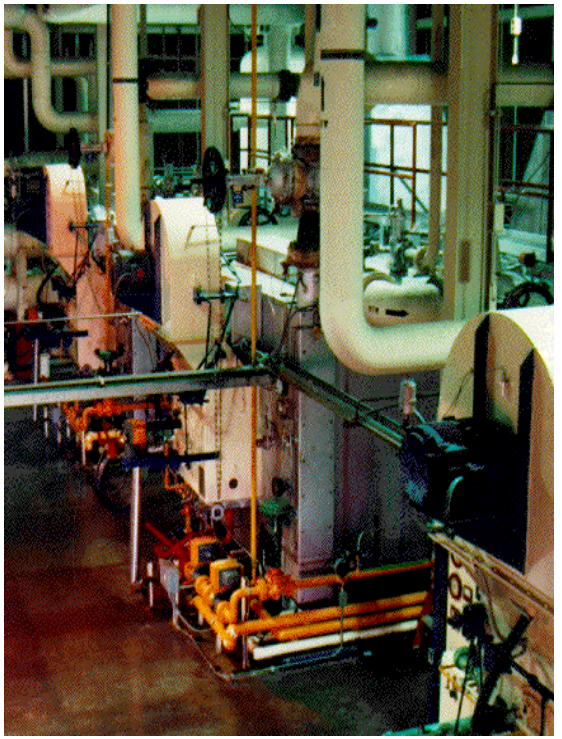
Success to Date



Private Sector Investment

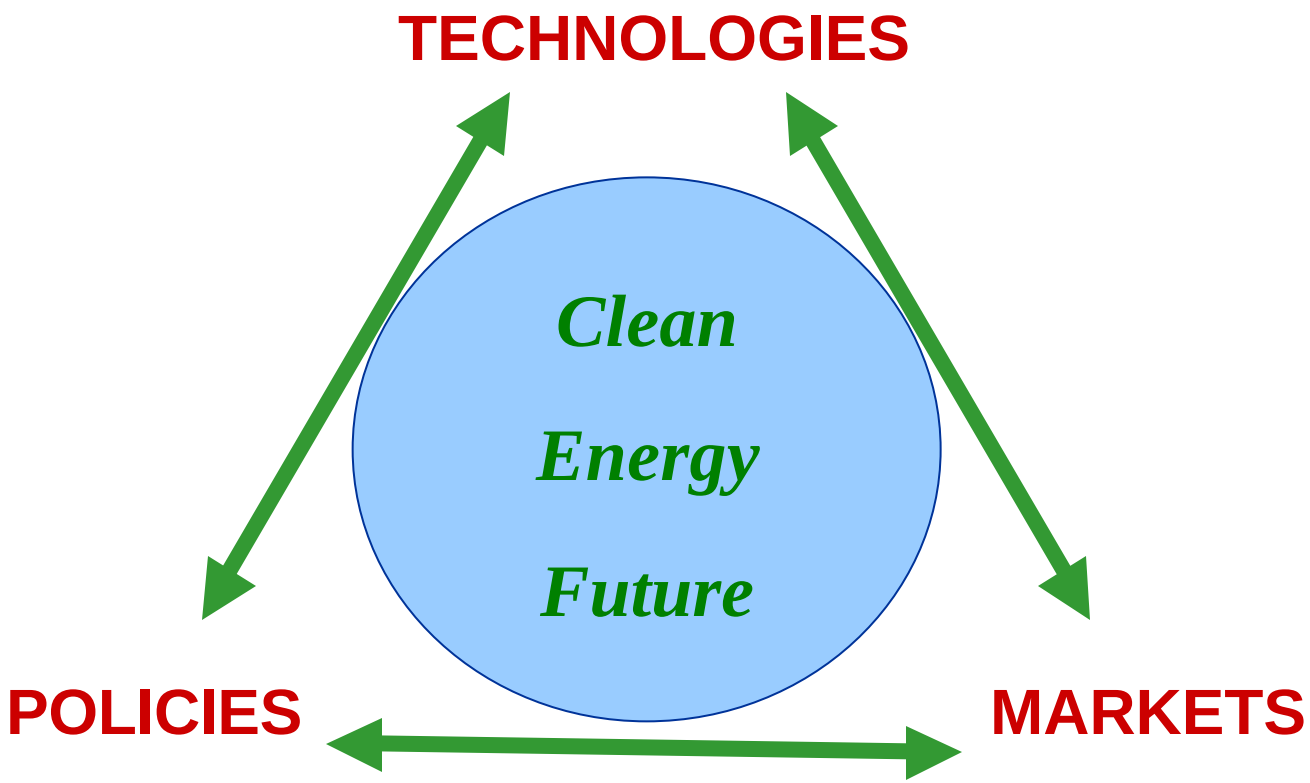
Liberty Island, NY
$ 1 Million

Hanford, WA
$ 160 Million



Twentynine Palms, CA
$ 4.7 Million

The Elements Of Success



Federal Government As Consumer

- $200 billion annually for products and services
- 500,000 buildings
- $8 billion annual energy bill
- Consumes 2% of the energy used annually in the U.S.

"Greening the Government"

- Improve building efficiency
  - 2005 = 30% 2010 = 35%
- Expand renewable energy use
- Enhance water conservation
- Improve industrial/laboratory efficiency
  - 2005 = 20% 2010 = 25%

Distributed Power Technologies

- Photovoltaics
- Solar Hot Water
- Wind
- Fuel Cells
- Gas Turbines
- Geothermal
- Biomass
- Hydropower

New Technology = Opportunity

8 Hesketh Street
Building Retrofit

4 Times Square
New Construction

Building Technologies

- High-efficiency windows
- High-efficiency air conditioning systems
- ENERGYSTAR® appliances
- Compact fluorescent lighting
- Absorption chillers

Renewable Technologies

Wind Turbines

Solar Electric

Geothermal

Wind Energy

1979: 40¢/kWh

- Increased turbine size
- R&D advances
- Manufacturing improvements

2000: 4-6¢/kWh

NSP 107 MW Lake Benton wind farm
4 cents/kWh (unsubsidized)

2007 Goal: 2-4¢/kWh

Geothermal Energy

1985: 15 - 16¢/kWh

- More industry experience
- Improved drilling technology
- Economies of scale
- Reduced cost of finance

2000: 5 - 8¢/kWh

2003: 4 - 6¢/kWh

Mammoth Pacific Geothermal Facility

Combined Heat & Power

- Utilization of waste heat perhaps largest single efficiency opportunity.
- Gas turbine advances provide increased heat:power ratio flexibility.

CHP efficiency: Up to 90%

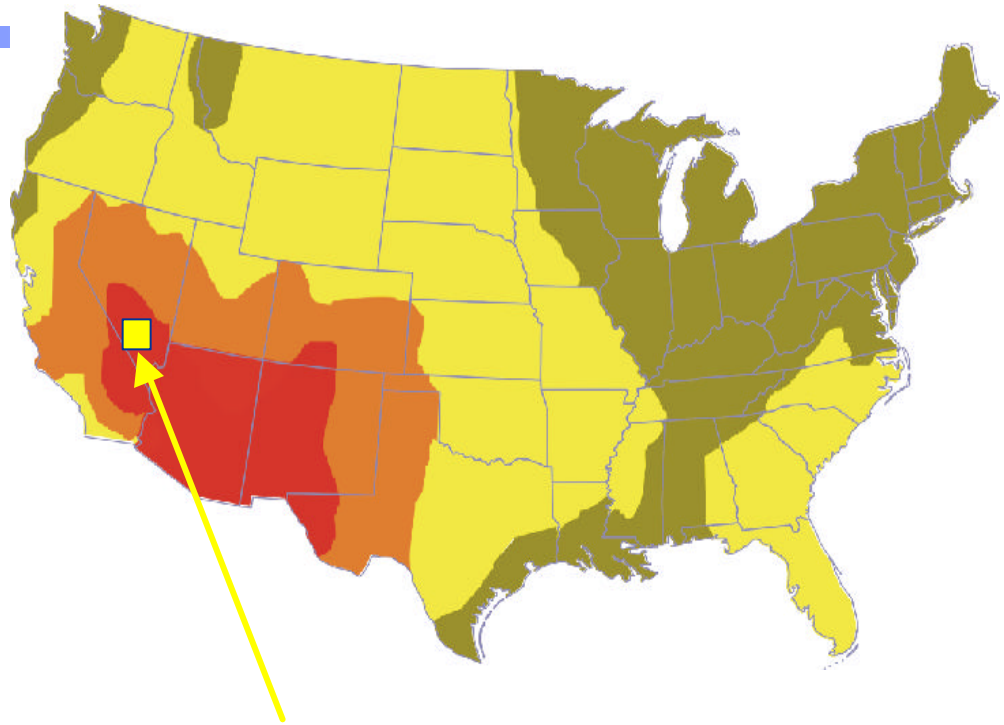
Electricity only efficiency: 34%

Photovoltaics

1980:
$1.00/kWh

2000:
~20¢/kWh

2005:
~10¢/kWh

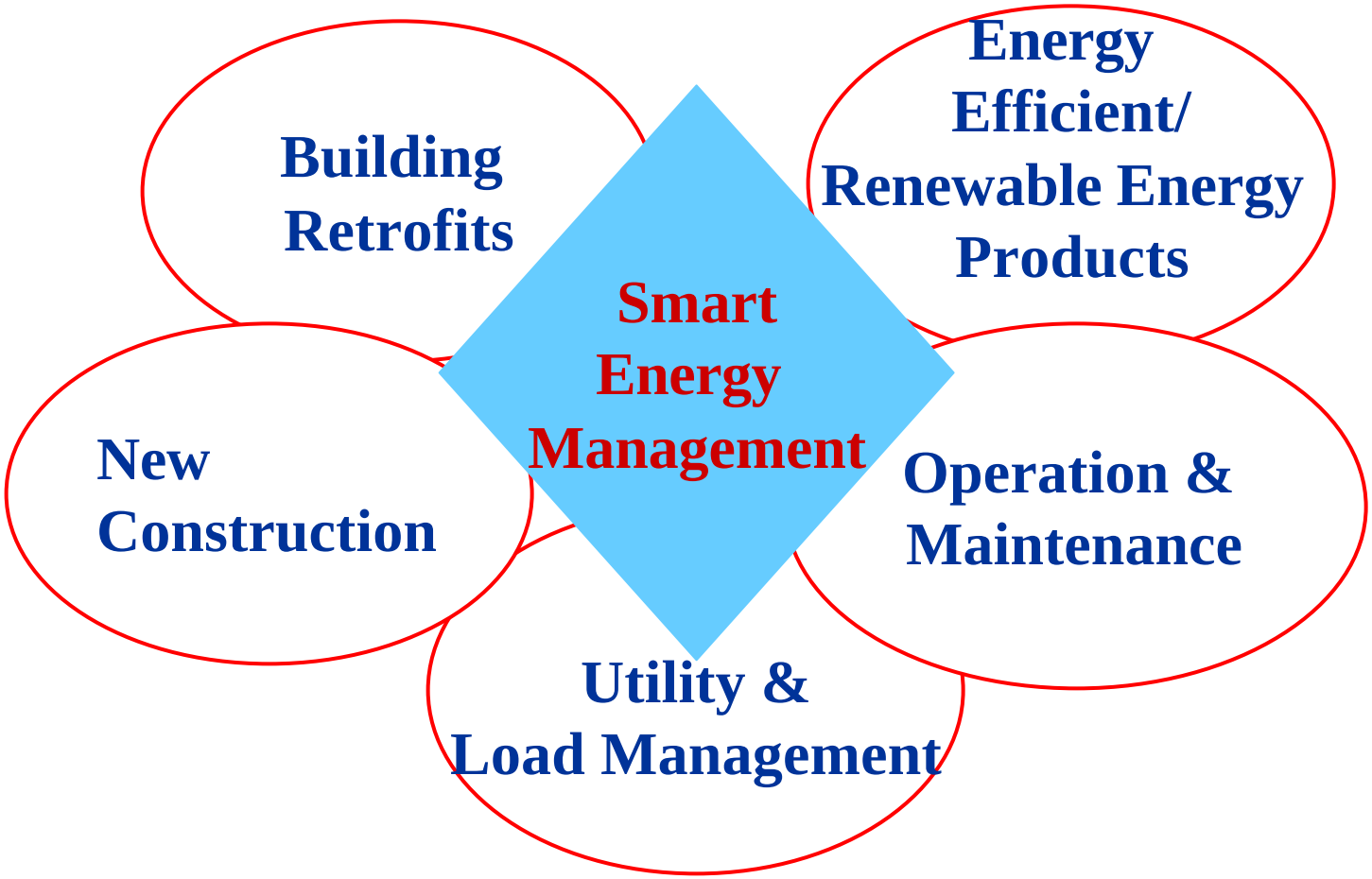


Solar can supply all electricity for the U.S. using this area (100x100 mi.) in the SW*

Using a distributed approach with systems installed on buildings, vacant land, and parking lots the same result could be achieved with PV in every state.

*SOURCE: A Realizable Renewable Energy Future, Science Magazine, July 30, 1999

Five Targets



Tools

- Facility energy audits
- Industrial process improvements
- ENERGYSTAR® buildings and products
- Sustainable design for new buildings
- Strategic purchase of electricity
- Distributed generation
- Off-grid generation
- Performance contracts & utility financing

Today's Challenges

- **Dept. of Defense = largest consumer**
- **Budget constraints**
- **Expanding use of project financing**
- **Supply + demand factors**

$35M Efficiency Upgrade Ft. Lewis, WA

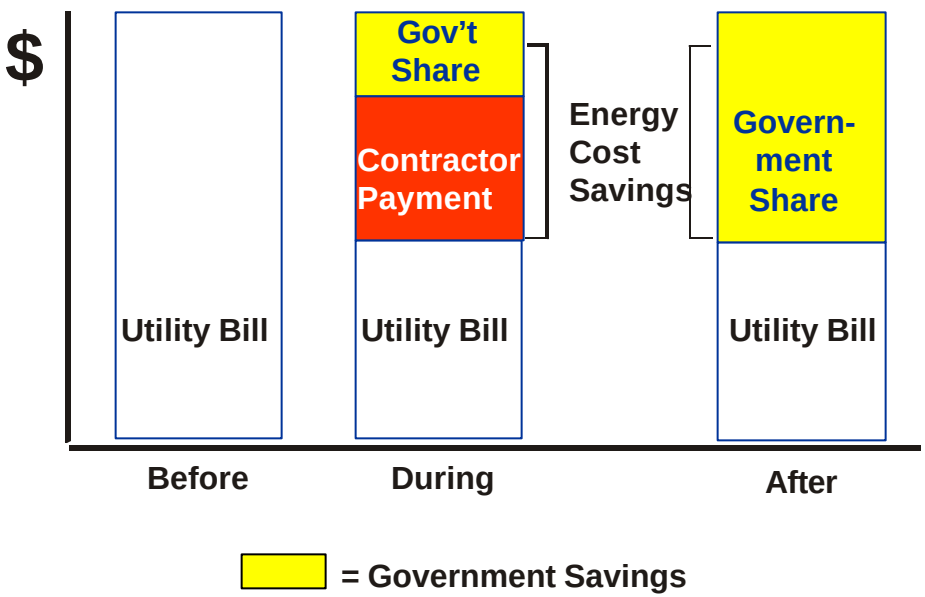
Madigan Army Medical Center

- Reduced energy, water, and wastewater costs
- Energy use dropped 16% reduction
- Energy saved = 1 year of energy for 1,835 WA State homes

Budget Constraint Means Increased Project Financing

Performance Contacting

A Key Tool



- *Energy Savings Performance Contracts (ESPC)*
- *Utility Energy Savings Contracts (UESC)*
- Only need technical and contracting support costs
- Future savings pay back investment

Federal Sector is a Major Test Bed

- Traditional energy- and water-saving techniques
- Cross-cutting applications
- New power technologies

Renewable Initiatives

- *Million Solar Roofs*
- *Wind Powering America*
- *Bioenergy Initiative*
- *GeoPowering the West*

Distributed Energy Revolution

Wind Power in Alaska

4 Times Square

Malden Mills/CHP

FEMAC Can Help Us To…

- Increase use of Federal project financing
- Promote sustainable design in Federal buildings
- Advance new technology in Federal sector
- Reach E.O. goals--
  - Increased efficiency
  - Lower GHG
  - more renewable energy

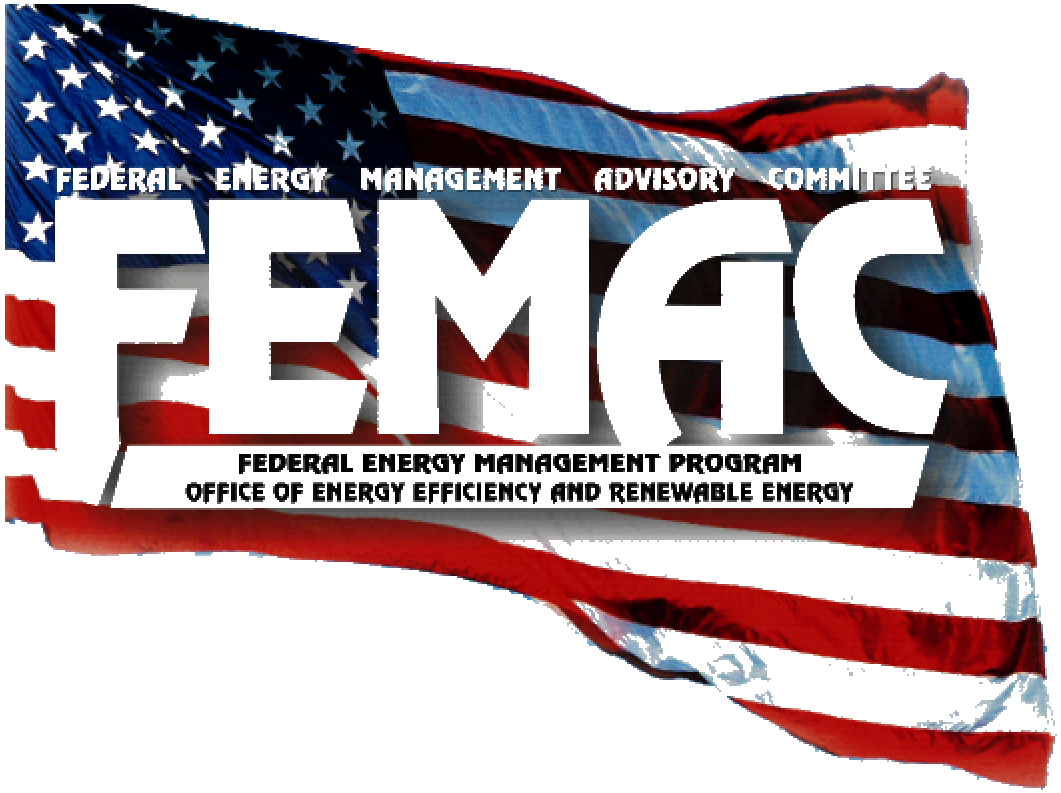
We Need FEMAC To…

- Become a high-performing group
- Bring sage “outside” advice and counsel to FEMP
- Reach industry and non-gov’t org. experts for input
- Use broad-based working groups
- Think outside the box--bring new, innovative ideas

Lessons We've Learned

…it takes all kinds of change to transform a market--

- Advance technologies
- Remove barriers
- Build markets
- Expand partnerships
- Promote smart policies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OFFICE OF ENERGY EFFICIENCY AND RENEWABLE ENERGY